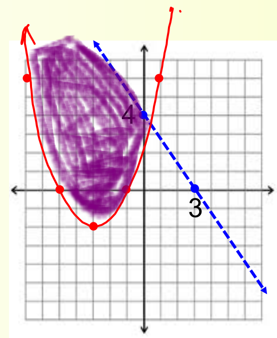
Alg. 2 Warm Up #2-2

Solve:

1) $|3x + 5| < -14$

2) $-\frac{4}{5}|x - 3| + 2 > 30$

3) Write a system of inequalities for the graph:

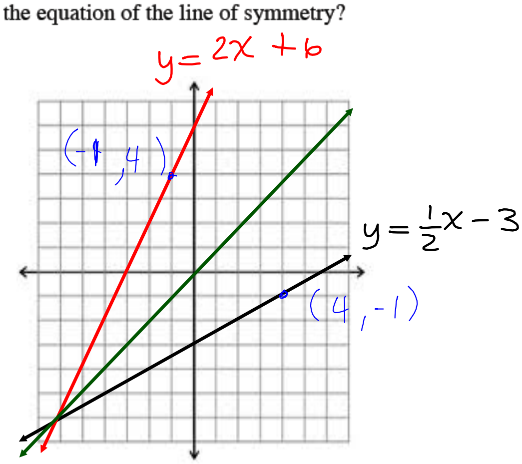


HW Questions:

5-8. Graph $y = \frac{1}{2}x - 3$ and its inverse function on the same set of axes.

a. What is the equation of the inverse function?

b. Does this graph, including both lines, have a line of symmetry? If so, what is the equation of the line of symmetry?

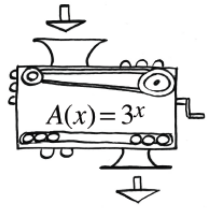


5-9. Antonio's function machine is shown at right.

a. What is $A(2)$?

b. If 81 came out, what was dropped in?

c. If 8 came out, what was dropped in? Be accurate to two decimal places.



5-10. Nossis has been working on his geometry homework and he is almost finished. His last task is to find a solution of $\sin(x)=0.75$. Nossis cannot figure out what x could be! Explain how he can find a value for x and show that it works.

9c) $3^x = 8$

$3^1 = 3$, $3^2 = 9$ so x is between 1 & 2. Since 8 is closer to 9, x will be closer to 2

test:

$3^{1.8} \approx 7.22$, $3^{1.9} \approx 8.06$ so x is closer to 1.9 $\Rightarrow 3^{1.89} \approx 7.98$

$\boxed{\text{Best: } x \approx 1.89}$

10) $x = \sin^{-1}(0.75)$

$x \approx \cancel{0.848}\ 48.6^\circ$

(Make sure you are in degree mode.)

5-11. If $10^x = 10^y$, what is true about x and y? Justify your answer.

They are the same!

5-12. Solve each of the following equations for x.

a. $\frac{x}{3}=\frac{4}{5}$ b. $\frac{x}{x+1}=\frac{5}{7}$ c. $\frac{6}{15}=2-\frac{x}{5}$ d. $15\left(\frac{2}{3}+\frac{x}{5}\right)=(6)15$

5-13. Sketch the solution of this system of inequalities.

$$y \ge x^2-5$$
$$y \le -(x-1)^2+7$$

$\frac{{}^{5}\cancel{15}}{1}\cdot\frac{2}{\cancel{3}} + \frac{15}{1}\cdot\frac{x}{5} = 90$

$10 + 3x = 90$

December 12, 2017

5-14. Jamilla collected data comparing the weight and cost of pieces of sterling silver jewelry. Her data is listed as (weight in ounces, cost in dollars): (5, 44.00), (8.5, 78.50), (12, 112.00), (10, 93.00), (7, 63.50), (9, 83.20).

a. Plot the data on a set of axes.

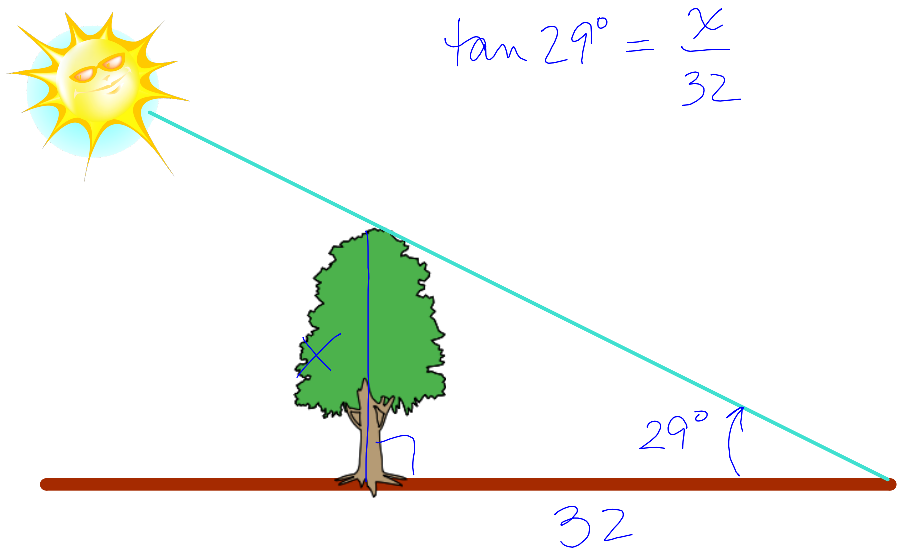
b. Use a ruler to draw a line that best approximates the data.

c. Determine the equation of the line of best fit drawn in (b).

d. Use your equation to predict the cost of a 50-ounce silver bracelet.

5-15. The angle of elevation of the sun (the angle the rays of sunlight make with the flat ground) at 10:00 a.m. is 29°. At that point, a tree's shadow is 32 feet long. How tall is the tree?

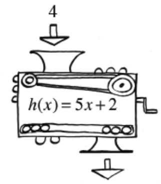
$$\tan 29^\circ = \frac{x}{32}$$



December 12, 2017

Yesterday's CP's

5-3. The function machine at right follows the equation $h(x) = 5x + 2$.



a. If the crank is turned backwards, what number should be pulled up into the machine in order to have a 4 come out of the top?

b. Keiko wants to build a new machine that will undo what $h(x)$ does to an input. What must Keiko's machine do to 17 to undo it and return a value of 3?

c. An "undo" function is called an **inverse** and has the notation $h^{-1}(x)$. Note that the –1 is not a negative exponent. It is the mathematical symbol that indicates the inverse function of $h(x)$. Write an equation for $h^{-1}(x)$, the "undo" function machine.

d. Choose a value for x. Then find a strategy to show that your equation, $h^{-1}(x)$, undoes the effects of the function machine $h(x)$.

what h does

- starts with input, x
- times 5
- add 2

undo for h inverse, h^{-1}

- start with input, x
- subtract 2
- $\div$ 5

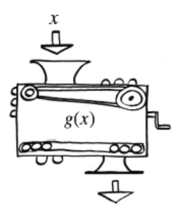
$$h^{-1}(x) = \frac{x-2}{5}$$

$$= \frac{1}{5}x - \frac{2}{5}$$

5-4. Keiko was working with a new function, $g(x)$. He wrote down the following steps for $g(x)$:

g →

- Add 5.
- Divide by 2.
- Cube it. (Find the third power.)
- Multiply by 6.



a. What is the equation for $g(x)$? What is the output when 3 is put in?

b. Help Keiko write down the steps (in words) of the inverse machine, $g^{-1}(x)$, and then write its equation.

c. Verify that your equation in part (b) correctly "undoes" the output of $g(x)$ in part (a).

a) $g(x) = 6\left(\frac{x+5}{2}\right)^3$

$g(3) = \ldots$

plug in 3

b) $g^{-1}(x)$

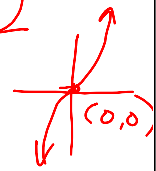
- input, x
- $\div$ 6
- cube root $\sqrt[3]{}$
- times 2
- subtract 5

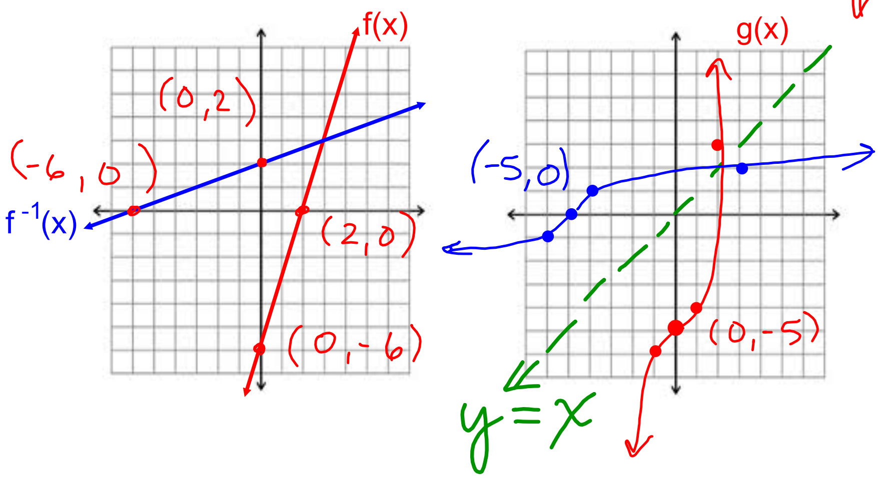
$$g^{-1}(x) = 2\sqrt[3]{\frac{x}{6}} - 5$$

5-5. Find the inverse equations for each of the functions below. Use function notation. Justify that each inverse equation works for its function.

a. $f(x) = 3x - 6$ $\quad f^{-1}(x) = \frac{x+6}{3}$ $\quad$ b. $g(x) = x^3 - 5$

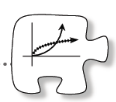
c. $p(x) = 2(x+3)^3$ $\quad f^{-1}(x) = \frac{1}{3}x + 2$ $\quad$ d. $t(x) = \frac{10(x-4)}{3}$





CP's: 5 - # 16 ---> 18 $\quad$ p. 216

5.1.2 How can I find an inverse?



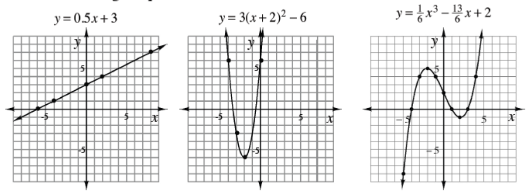
Using a Graph to Find an Inverse

What factors would you consider if you were thinking about buying a car? The first things that come to mind might be color or cost, but increasingly people are considering fuel efficiency (the number of miles a car can drive on a gallon of gas). You can think of the average number of miles per gallon that a car gets as a function that has *gallons* as the input and *miles traveled* as the output. A graph of this function would allow you to use what you know about the number of gallons in your tank to predict how far you could travel.

What would happen if you wanted to look at this situation differently? Imagine you regularly travel a route where there are many miles between gas stations. In this scenario, you would start with the information of the number of miles to the next filling station, and want to determine how many gallons of gas you would need to get there. In this case, you would start with the number of miles and work backwards to find gallons. Your new function would reverse the process.

5-16. In Lesson 5.1.1 you started with functions and worked backwards to find their inverse equations. Now you will focus on functions and their inverses represented as graphs. Use what you discovered yesterday as a basis for answering the questions below.

$y = 0.5x + 3$ $\quad$ $y = 3(x+2)^2 - 6$ $\quad$ $y = \frac{1}{6}x^3 - \frac{13}{6}x + 2$



a. Obtain a Lesson 5.1.2 Resource Page from your teacher and make a careful graph of each inverse equation on the same set of axes as its corresponding function. Look for a way to make the graph without finding the inverse equation first. Be prepared to share your strategy with the class.

b. Make statements about the relationship between the coordinates of a function and the coordinates of its inverse. Use $x \rightarrow y$ tables of the function and its inverse to show what you mean.

5-17. When you look at the graph of a function and its inverse, you can see a symmetrical relationship between the two graphs demonstrated by a line of symmetry.

a. Draw the line of symmetry for each pair of graphs in problem 5-16.

b. Find the equation of the line of symmetry for each graph.

c. Why do you think this line makes sense as the line of symmetry between the graphs of a function and its inverse relation?

5-18. The line of symmetry you identified in problem 5-17 can be used to help graph the inverse of a function without creating an $x \to y$ table.

a. Graph $y = (\frac{x}{2})^2$ carefully on a full sheet of graph paper. Scale the x- and y-axes the same way on your graph.

b. On the same set of axes, graph the line of symmetry $y = x$.

c. Trace over the curve $y = (\frac{x}{2})^2$ with a pencil or crayon until the curve is heavy and dark. Then fold your paper along the line $y = x$, with the graphs on the inside of the fold. Rub the graph to make a "carbon copy" of the parabola.

d. When you open the paper you should see the graph of the inverse. Fill in any pieces of the new graph that did not copy completely. Justify that the graphs you see are inverses of each other.

HW: 5-

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